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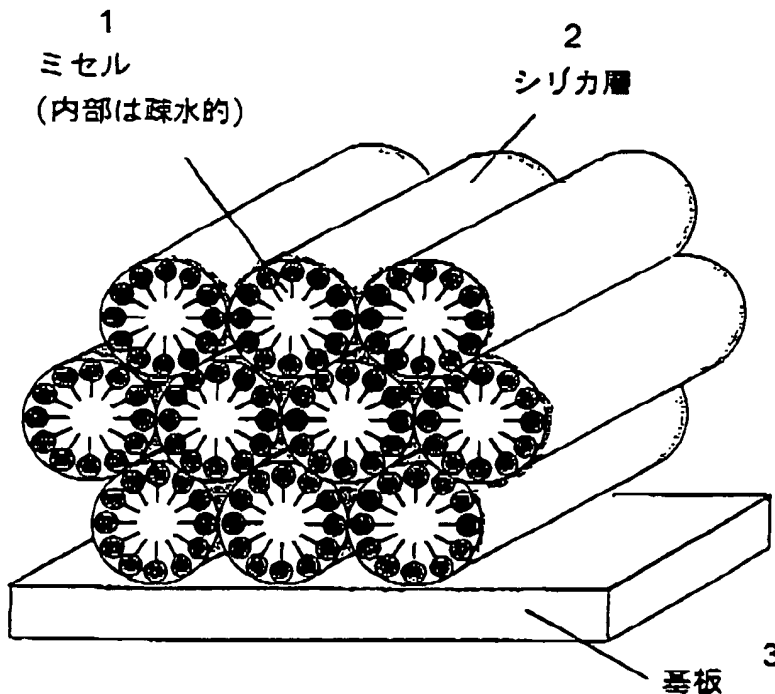
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- (51) 国際特許分類: G01N 5/02 (72) 発明者; および  
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(71) 出願人 (米国を除く全ての指定国について): 学校法人東京薬科大学 (TOKYO UNIVERSITY OF PHARMACY AND LIFE SCIENCE) [JP/JP]; 〒192-0392 東京都八王子市堀之内1432-1 Tokyo (JP).  
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(81) 指定国 (国内): CN, US.

(続葉有)

(54) Title: CRYSTAL OSCILLATOR NANOCHANNEL SENSOR

(54) 発明の名称: 水晶振動子型ナノチャンネルセンサー



- 1...MICELLE (INSIDE IS HYDROPHOBIC.)  
2...SILICA LAYER  
3...SUBSTRATE

展開を可能とする。

(57) Abstract: A crystal oscillator nanochannel sensor comprises a nanochannel structure thin film arranged on an electrode surface of a crystal oscillator and having an oxide layer which contains a surfactant micelle. The sensor senses the existence of a target substance in an analyte solution through a weight change in a nanochannel caused by a recognition reagent and the target substance collected by the recognition reagent. The invention provides a new application of crystal oscillator sensors by utilizing a hydrophobic site provided by the surfactant in a nanometer-size pore.

(57) 要約: 酸化物質層が界面活性剤ミセルを内包しているナノチャンネル薄膜を水晶振動子の電極面に配設し、ナノチャンネル内での認識試薬とこれに捕集された標的物質による重量変化から、検体溶液中の標的物質の存在を検出し、ナノメートルサイズの細孔内の界面活性剤の存在が与える疎水場に着目し、水晶振動子型センサー機能の新しい

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(84) 指定国(広域): ヨーロッパ特許(AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR).

2文字コード及び他の略語については、定期発行される各PCTガゼットの巻頭に掲載されている「コードと略語のガイダンスノート」を参照。

添付公開書類:

— 国際調査報告書

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP03/11385

A. CLASSIFICATION OF SUBJECT MATTER  
Int.Cl<sup>7</sup> G01N5/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
Int.Cl<sup>7</sup> G01N5/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1922-1996	Toroku Jitsuyo Shinan Koho	1994-2003
Kokai Jitsuyo Shinan Koho	1971-2003	Jitsuyo Shinan Toroku Koho	1996-2003

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
JOIS (JICST FILE)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KAMISHO, TANAMURA, UCHIDA, TERAMAE, "Kaimen Kasseizai-Silica Nano Kozotai o Riyo shita Ion Ninshiki", The Japan Society for Analytical Chemistry Dai 50 Nenkai Koen Yoshishu, 09 November, 2001 (09.11.01), page 208	1-7
Y	TANAMURA KAMISHO, YAMASHITA, UCHIDA, TERAMAE, "Kagaku Shushokugata Nano Saikotai Sosei to Keiko Puropu o Mochiita Saikonai Kankyo Hyoka", The Japan Society for Analytical Chemistry Dai 49 Nenkai Koen Yoshishu, 12 September, 2000 (12.09.00), page 122	1-7

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance  
 "E" earlier document but published on or after the international filing date  
 "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)  
 "O" document referring to an oral disclosure, use, exhibition or other means  
 "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  
 "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone  
 "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art  
 "&" document member of the same patent family

Date of the actual completion of the international search  
10 December, 2003 (10.12.03)

Date of mailing of the international search report  
24 December, 2003 (24.12.03)

Name and mailing address of the ISA/  
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

ATTACHMENT F

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP03/11385

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	IYOSHI, KUROSAWA et al., "MPS-maku o Hifuku shita QCM no Shitsudo Sensor to shite no Oyo", The Surface Finishing Society of Japan Dai 104 Kai Koen Taikai Koen Yoshishu, 07 September, 2001 (07.09.01), pages 15 to 16	1-7
P,X P,Y	JP 2003-121329 A (President of Nagoya University), 23 April, 2003 (23.04.03), Full text; Figs. 1 to 3 (Family: none)	2-4, 7 1
P,X P,Y	IKEDA, UCHIDA, FUJIWARA, "Suisho Shindoshigata Nano Channel Sensor no Kochiku", The Japan Society for Analytical Chemistry Dai 51 Nenkai Koen Yoshishu, 05 September, 2002 (05.09.02), page 107	1, 3-6 2
A	Hongyou Fan, et al., Nature Vol.405, 04 May, 2000 (04.05.00), pages 56 to 60	1-7
A	HIRAYAMA, KAMEOKA, "Bunshi Imprinting-ho ni yoru Lyzozyme Chugata no Gosei Oyobi Sono Suisho Shindoshiki Sensor eno Oyo", Bunseki Kagaku, Vol.49, No.1, 2000, pages 29 to 33	1-7